DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

E6WE
Revision 17

HONEYWELL
(AlliedSignal,Garrett)

TFE731-2, -2A, -2B, -2BR,
-2C, -3, -3R, -3A, -3AR,
-3B, -3BR, -3C, -3CR,
-3D, -3DR, -4, -4R, -5,
-5A, -5AR, -5B, -5BR, -5R

MAY 9, 2000

TYPE CERTIFICATE DATA SHEET NO. E6WE

Engine models described herein conforming with this data sheet (which is part of Type Certificate No. E6WE) and other approved data on file with the Federal Aviation Administration (FAA) meet the minimum standards for use in certified aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER: Honeywell International Inc.
111 South 34th Street
Phoenix AZ 85034

Model: TFE731-2, -2A, -2B, -2BR, -2C, -3, -3R, -3A, -3AR, -3B, -3BR, -3C, -3CR, -3D, -3DR, -4, -4R, -5, -5A, -5AR, -5B, -5BR, -5R

Type: Turbofan: One stage geared fan, four stage axial flow low pressure compressor, one stage centrifugal high pressure compressor, annular combustor, one stage high pressure turbine, and three stage low pressure turbine.

Static Thrust Ratings:

TFE731 Models	Maximum Continuous at Sea Level, lbs.	Takeoff at Sea Level, lbs. (5 mins.)
-2, -2B, -2C	3500	3500
-2A	3600	3600
-2BR	3500	3650
-3, -3A, -3C, -3D	3700	3700
-3R, -3AR, -3CR, -3DR	3700	3880
-3B	3650	3650
-3BR	3650	3850
-4	4080	4080
-4R	4080	4080
-5	4304	4304
-5R	4304	4500
-5A	4500	4500
-5AR	4500	4500
-5B	4634	4750

-5BR	4634	4750

Controls (See Note 11)

Principal Dimensions

Refer to the installation drawing for each specific engine model configuration for dimensions and center of gravity location.

Weight, Dry, Pounds (maximum):

TFE731 Models	Lbs.	TFE731 Models	Lbs.
-2	743	-4, -4R	822
-2A	772		
-2B, -2BR	773	-5, -5R	852
-2C	753	-5A, -5AR	884
-3, -3R	754	-5B, -5BR	899
-3A, -3AR	775		
-3B, -3BR	769		
-3C, -3CR	777		
-3D, -3DR	767		

The engine weights shown herein are that of the power section and all components coded "E" in the Engine Equipment List. The total engine weight, including the weight of items coded "A" in the Engine Equipment List, is included on the engine installation drawing for each specific aircraft configuration.

Fuel

Fuels conforming to Honeywell International Inc. Specifications EMS 53111 (Jet A Type), EMS 53112 (Jet A-1 and JB-8 Types), EMS 53113 (Jet B and JP-4 Types), and EMS 53116 (JP-5 Type).

BIOBAR JF biocide additive is approved for use in the fuel at a concentration not to exceed 20 ppm of elemental boron. KATHON FP 1.5 biocide additive is approved for use in the fuel at a concentration not to exceed 100 ppm.

Shell ASA-3 Anti-Static Additive, or equivalent, in amounts to bring the fuel up to a range of 50 to 450 conductivity units for JET A, JET A-1, and JET B, or up to a range of 200 to 600 conductivity units for JP4, 5, and 8, is permissible as long as the quantity added does not exceed one part per million.

MIL-I-27686 "D" and "E" inhibitor, icing, fuel system, or equivalent, are approved for use in amounts up to 0.15 percent by volume.

Aviation Gasoline, MIL-G-5572D, Grade 80/87, 100/130, and 115/145, not in excess of 500 gallons per 100 hours of operation, may be used in emergencies in TFE731-2/-3 series engines which do not incorporate a fuel heater.

Oil

Oil conforming to Honeywell International Inc. Specification EMS 53110, Type 2.

Certification Basis

14 CFR part 33 dated April 3, 1967, and Amendments 1, 2, and 3, and Special Condition No. 33-44-WE-13. Type Certificate No. E6WE, issued August 31, 1972, for -2; September 12, 1974, for -3; January 13, 1978, for -3R; January 22, 1981, for -3A and -3AR; March 3, 1981, for -3B and -3BR; November 22, 1983, for -5 and -5R; December 10, 1984, for the -5A; July 7, 1986, for -5AR; September 16, 1988, for -2A, -2B, and -2BR; February 7, 1991, for -5B and -5BR; November 7, 1991, for -4 and -4R; January 22, 1993, for -3C and -3CR; and October 28, 1994, for -3D and -3DR; and March 23, 1998, for -2C.

Date of application for type certificate June 25, 1969.

Production Basis

Production Certificate No. 413 issued March 4, 1965, and reissued as Production

Certificate No. 413NM to Honeywell International Inc. on January 25, 2000.

NOTE 1. Maximum permissible continuous engine operating speeds for the engine rotors are as follows:

TFE731 Models	Low Pressure Rotor (N1) RPM	High Pressure Rotor (N2) RPM
-2	20,688	29,692
-2A, -2B, -3, -3A, -3B, -3C, -3D, -5, -5A	21,000	29,692
-2BR, -3R, -3AR, -3BR, -3CR, -3DR, -4, -5R, -5AR	21,000	29,989
-2C	20,688	30,100
-4R, -5B	21,000	30,300
-5BR	21,000	30,540

NOTE 2. Temperature Limits:
Maximum Interstage Turbine Temperature (ITT) Limits: °F (°C)

TFE731 Models	Max. Continuous	Takeoff (5 Mins.)	Starting (Ground/Air)
-2	1530 (832)	1580 (860)	1580 (860)
-2C	1590(865)	1615 (880)	1615 (880)
-3, -3A	1625 (885)	1665 (907)	1665 (907)
-3R, -3AR	1625 (885)	1705 (929)	1665 (907)
-2A, -2B	1625 (885)	1635 (890)	1665 (907)
-2BR	1625 (885)	1680 (916)	1665 (907)
-3B	1635 (890)	1635 (890)	1635 (890)
-3BR	1635 (890)	1680 (916)	1635 (890)
-3C, -3D	1670 (910)	1670 (910)	1670 (910)
-3CR, -3DR	1670 (910)	1705 (929)	1670 (910)
-4, -5, -5A	1696 (924)	1746 (952)	1746 (952)
-4R, -5R, -5AR	1696 (924)	1786 (974)	1746 (952)
-5B	1775 (968)	1793 (978)	1793 (978)
-5BR	1775 (968)	1824 (996)	1793 (978)

Maximum Oil Inlet Temperature Range, °F (°C) for all engine models:

	Sea Level to 30,000 Feet	Above 30,000 Feet
Fan Gearbox Inlet Maximum	260 (127)	284 (140)
Accessory Gearbox Inlet Maximum	300 (149)	315 (157)

Fan gearbox oil temperature transient of 300°F (149°C) for a maximum of 2 minutes is permitted for all operational altitudes.

External engine components, maximum temperature (limiting temperature of specific components) are as specified in the applicable engine installation manual, (See Note 16).

Operation at an engine fuel inlet temperature as high as 135°F (57°C) and as low as -65°F (-54°C) is approved with fuel at or above the pour point during starting. If fuel that does not contain an approved anti-icing additive is used, an approved engine fuel heater, or an alternate system capable of maintaining a fuel filter inlet temperature of 35°F, must be used. In installations that do not use an approved fuel heater and may extract motive flow for aircraft injector systems, engine operation with inoperative electronic fuel control is limited to a minimum inlet fuel temperature of 12°F (-11°C) with 1000 pounds per hour (maximum) motive flow extraction and -31°F (-35°C) without motive flow extraction. Installations

which are equipped with the hydromechanical fuel control heater are approved for operation with fuel inlet temperature as low as -65°F (-54°C) provided fuel is at or above pour point.

NOTE 3. Pressure Limits:

Fuel pump inlet pressure, minimum	(Refer to applicable engine installation manual (See Note 16).
maximum	50 psig
Oil pressure at inlet connection to engine, minimum	4.0 psia
Oil normal operating pressure	38 to 46 psig
At idle, minimum	25 psig

(Refer to applicable engine installation, manual (See Note 16).

NOTE 4. The ratings are based on static test stand operation and under the following conditions:

(a) No loading of accessory drives.
(b) No compressor bleed airflow.
(c) Bellmouth inlet conforming to Honeywell International Inc. SKP17308 (TFE731-2, -2A, -2B, -2BR, -2C, -3, -3A, -3AR, -3R, -3B, -3BR, -3C, -3CR, -3D, -3DR, -4 and -4R models) and SKP23600 (TFE731-5, -5R, -5A, -5AR, -5B, and -5BR models).
(d) Fan exhaust and turbine exhaust nozzles conforming to Honeywell International Inc. Drawing SKP17303 (TFE731-2 and -2C models), SKP17402 (TFE731-2A, -2B, -2BR, -3, -3R, -3A, -3AR, -3B, -3BR, -3C, -3CR, -3D, and -3DR models), SKP24628 (TFE731-4 and -4R models), SKP17829 (TFE731-5 and -5R models), SKP23873 and SKP23640 (TFE731-5A and -5AR models), and SKP24301 and SKP23640 (TFE731-5B and -5BR models). The aerodynamic flow path of this fan duct includes Honeywell International Inc. operational air-oil coolers (P/Ns 158600, 159900, and 159910 with oil flowing).
(e) No anti-icing airflow.
(f) Interstage Turbine Gas Temperature (ITT) and rotor speed limits not exceeded.

NOTE 5. Accessory Drive Provisions:

Accessory Drive	Drive Type	Drive Modification	Rotation Facing Drive End and RPM at N_2 of 29,024 RPM	Maximum Torque (lb.-in.) T_c	T_o	T_s	Accessory Weight Pounds Maximum	Maximum Overhung Moment (lb.-in.)
Starter or Starter Generator	AND 20002 Type XII-D (Modified)	Pad rotated, rpm, torques, accessory weight and moment	CW 12,000	210	315	1600	45	400
Aircraft Accessory	AND20002 Type XII-D (Modified)	Pad rotated, rpm, torques, accessory weight and moment	CW 12,000	210	315	1000	40	400
Aircraft Accessory	AND 20001 Type XI-B (Modified)	Pad rotated, rpm, torques, accessory weight and moment	CW 6,000	250	375	1650	15	100

CW = Clockwise
T_c = Continuous Torque
T_o = Torque Overload
T_s = Static Torque

NOTE: Total weight of the accessories is not to exceed 95 pounds. Refer to the applicable engine installation manual (See Note 16).

NOTE 6. Custom Bleed Airflow Limits. Refer to the applicable engine installation manual (See Note 16).

NOTE 7. These engines meet FAA requirements for turbine disk integrity and rotor blade containment.

NOTE 8. These engines meet FAA requirements for operation in icing conditions within the envelope defined in 14 CFR part 25, Appendix C.

NOTE 9. Certain engine parts are life-limited. These limits are listed in the FAA approved Honeywell International Inc. Service Bulletins TFE731-72-3001 and TFE731-72-3501.

NOTE 10. These engine models meet the requirements of Special Condition No. 33-44-WE-13.

NOTE 11. Variations in engine configuration and installation components are identified by a suffix to the basic model number on the engine nameplate; i.e. TFE731-2-XY, ("X" denotes Honeywell installed configurations rating code number(s) and "Y" denotes Honeywell equipment code letter(s) of aircraft manufacturer), and an Engine Equipment List number. Certain features of these components are influenced by aircraft design considerations. In the Engine Equipment List, those items coded "E" are basic engine items and are controlled by Part 33 of the Federal Aviation Regulations. Items coded "A" have been demonstrated as compatible with the basic engine during engine certification testing. However, the operation, functioning, and performance of these in a specific aircraft installation must be demonstrated during aircraft certification. Subsequent design control associated with these factors is the responsibility of the aircraft manufacturer.

NOTE 12. Power setting, power checks and control of engine thrust output in all operations is to be based on Honeywell International Inc. engine charts referring to low pressure rotor speed (N_1). Speed sensors are included in the engine assembly for this purpose.

NOTE 13. The TFE731-2BR, -3R, -3AR, -3BR, -3CR, -3DR, -4R, -5AR, -5BR, and -5R turbofan engines with their electronic fuel control systems are adjusted for the limits noted herein.

NOTE 14. For additional authorized operation and installation detailed information, see FAA-approved sections of the applicable engine installation manual (See Note 16).

NOTE 15. These engines meet the requirements of §§ 33.68, 33.71(c), 33.75, 33.77 and 33.90 effective with Amendment 33-6.

NOTE 16. The engine installation manual numbers are applicable to the respective engine models as follows:

IM-8001:	TFE731-2, -2C, -3, -3R, -3A, -3AR, -3B, -3BR, -3C, -3CR, -3D, -3DR
IM-7440:	TFE731-4, -4R
IM-4200:	TFE731-5, -5R, -5A, -5AR, -5B, -5BR

NOTE 17. These engines are in compliance with Part 34 of the Federal Aviation Regulations.

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